SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Audit of the Everglades Construction Project Procurement Process

Audit #97-15

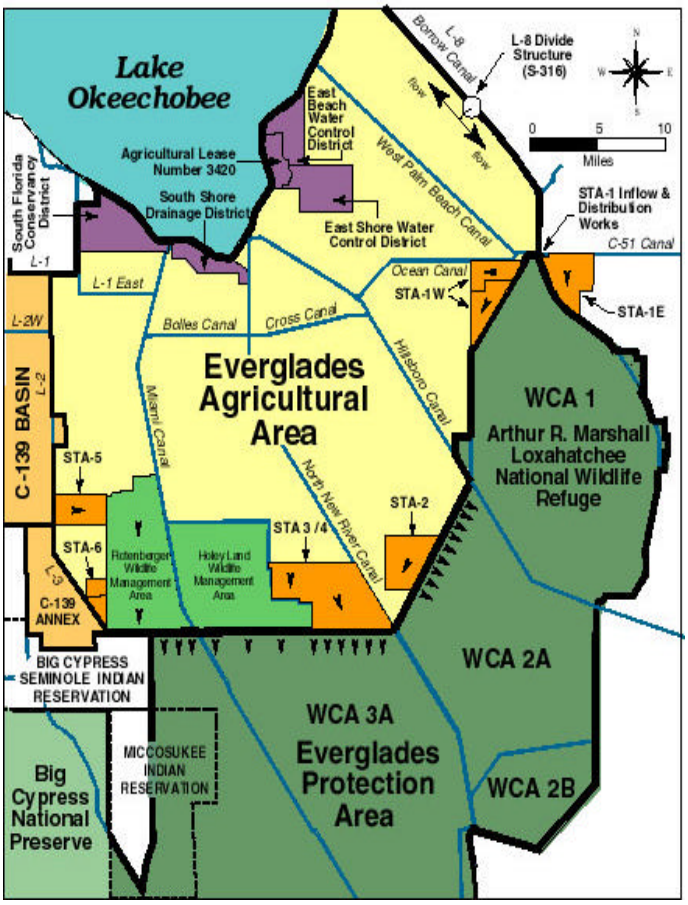
Prepared by
Office of Inspector General

Allen Vann, Inspector General
Tim Beirnes, Senior Audit

TABLE OF CONTENTS

INTRODUCTION

This report details the results of our audit of the Everglades Construction Project (ECP). The audit's primary objectives focused on whether the contracts awarded to date for the ECP were properly awarded and conform to District procurement policies and procedures, and represent a best practices business approach to obtain the greatest value for the taxpayers.



In February 1994, the Florida Legislature passed the Everglades Forever Act (EFA). The Act outlines the framework for the restoration of the Florida Everglades and can be found in Chapter 373.4592 Florida Statutes. The EFA specifies seven (7) major elements, which constitute the Everglades Program. The District and the Florida Department of Environmental Protection have developed project management plans resulting in 55 projects within the seven major elements to comply with the EFA. The ECP involves 18 of the 55 projects that are collectively the focal activities and the most resource intensive of the Everglades Program. The primary components involve constructing large filter marshes to treat polluted water run-off from the Everglades Agriculture Area (EAA). Six “Stormwater Treatment Areas” (STAs), approximately 47,250 acres in size, will ultimately, naturally treat 1.4 million acre-feet per year of stormwater runoff. Current estimates place the cost of the entire Everglades Program at $796 million, of which, $718.3 million (90%) is for ECP projects. The EFA includes a number of specific deadlines for completing construction of the STAs. As such, many of the projects are required to be completed concurrently. The size and scope of this effort to date has well exceeded any design and construction effort previously undertaken by the District in its history as an agency.

Aside from land acquisition, the ECP entails procuring engineering services and resulting construction work. Design services have been procured using the Consultant's Competitive Negotiation Act (CCNA) process (F.S. 287.055). All construction contracts have been procured via the sealed competitive bidding process. Guidance for procurement of ECP services and construction is contained in the District's *Procurement and Contracting Policy 7.10000*. Procurement policies for the ECP are virtually the same as for procurement of all goods and services by the District, with the exception of higher approval threshold limits for ECP contracting activity. The Governing Board approved higher authorization thresholds for the ECP in November 1996. These changes are incorporated into the latest policy revision as of November 14, 1996, noted above.

Accomplishment of the ECP is the responsibility of the District's Director of Everglades Construction. Primary activities, since enactment of the EFA in 1994, were planning and design and land acquisitions. In 1995 the majority of design work was procured. The bidding and awarding of construction contracts commenced in 1997. Approximately $85.7 million worth of contracts have been awarded to date. It is estimated that $332 million in contracts will be awarded over a ten-year period.

OBJECTIVES, SCOPE AND METHODOLOGY

The overall audit objectives were to determine if contracts for the ECP were properly awarded and conform to District procurement rules and that a best practices approach was applied. In general, the audit focused on the following two broad objectives:

- Evaluating the reasonableness of the ECP construction related costs, and

- Assessing the degree of compliance with the Everglades Forever Act, other State Statutes, and District policies and procedures.

The scope of the audit encompassed ECP contracts executed since inception through the beginning of audit fieldwork. These contracts were primarily consulting contracts for engineering design services. We added several more construction contracts to the scope that were solicited and executed during the course of our audit fieldwork. Our fieldwork was performed during a period of time that was very active for bidding and awarding construction contracts. The following table lists the contracts selected for audit.

Project	ENGINEERING		CONSTRUCTION	
	Contract Number	Contract Amount	Contract Number	Contract Amount
STA 1W Works	C-E101	$ 3,317,000	C-E107	$ 18,334,000
STA 2W Works	C-E201	5,518,000	C-E208	24,571,000
STA-6 Sec1. Works	C-E500	255,000	C-E600	1,861,000
STA 5 Works	C-E500	1,402,000	C-E503	10,937,000
STA 1W&1E (Inflow & Distribution)	C-E104	1,243,000	C-E111	6,488,000
Total Reviewed		**$ 11,735,000**		**$ 62,191,000**
Total Awarded to Date		**$ 19,008,000**		**$ 66,742,500**

Methodology included the following:

- Review of contract files maintained by Contract Administrators and Project Managers,

- Interviews and inquiries of District personnel, vendors, and others as deemed necessary,

- Physical observations such as bid openings, negotiation sessions, change order negotiations, site visits, etc.,

- Consultation with other Government organizations, e.g., The U.S. Army Corps of Engineers and the Florida Department of Transportation, and

- Other procedures as deemed necessary.

Our audit was conducted in accordance with generally accepted government auditing standards.

RESULTS IN BRIEF

Design Costs

Overall, the aggregate design costs for the Everglades Construction Project appeared to be reasonable compared to various benchmarks. While our analysis indicates that design costs fall within a reasonable range, in our opinion, there were certain aspects of the negotiation process and related strategies that could have been employed to further improve the results. Generally, ECP contracting activity reflected common District procurement practices.

Construction Management Costs

Projected construction management costs, which include combined internal and external construction management services for the projects sampled, exceed the projected 6.5% of construction cost used in the Conceptual Design Document by $1.7 million. While design services were provided under fixed price contracts, construction management services are being provided under unit price contracts with "not-to-exceed" maximums. Planned level of expenditure for construction management services should be reevaluated to identify strategies for possible cost reductions and savings.

Bid Preparation and Solicitation Procedures

Based upon our review, we concluded that bid preparation and solicitation procedures were properly planned, and the most appropriate solicitation method was selected for individual procurement actions. We also noted that the most appropriate payment method was selected for the type of work to be performed. Bid solicitation documents contained complete statements of work, drawings, specifications, schedules, adequate terms and conditions, and an explanation of how proposals/bids would be evaluated. Contracts were properly solicited and public notice/outreach stimulated sufficient interest, resulting in a fair level of competition. The time allowed for contractors to prepare bids was reasonable.

Selection Practices For Engineering Services

The selection practices for engineering services appeared to be performed objectively. Our observations of sealed bid openings for the letting of construction contracts indicated that the integrity of the process was maintained. Subsequent to bid opening, lowest bidders were properly

screened to ensure that they were responsive and responsible. Insurance and bonding requirements were met by the contractors and were verified by District staff. Similarly, the requirements of the District's Minority/Women Business Enterprise Program were adhered to.

Price Negotiation Practices and Procedures

Price negotiation practices and procedures, however, can be improved upon. The District's negotiating teams relied solely on non detailed estimates for design services. Independent detailed cost estimates for engineering projects, prior to receiving the initial fee estimates from the engineering firms, were never prepared. In the absence thereof, the District could not demonstrate to our satisfaction that it had a planned negotiating strategy for the ECP design contracts, with specific goals, that upon conclusion of negotiations would demonstrate the reasonableness of the final agreed upon fees.

While the District negotiated level of effort, it did not negotiate labor rates with any of the firms or make a determination as to the fairness of the contracted rates. The District accepted actual labor rates paid by the firm to selected individuals without regard to the average salary rates paid by the firms for individuals in the same job classification. This likely resulted in higher costs because the individuals selected were generally highly paid. Also, the hourly rates paid varied considerably between firms. On average, hourly rates ranged from $60.04 to $73.34, for a difference of 18.1% between the lowest firm to the highest firm.

We compared firm billing rates for various staff categories, ranging from principal to clerical professions, to a fee survey. After considering firm size, region, industry, business sector, etc., we determined that there were opportunities to reduce engineering design costs by as much as $1.2 million through better negotiating procedures. Furthermore, we found that the District's design contracts contain higher multiplier rates than other government entities that routinely procure engineering services. Capping the overhead rates or requiring preaward audits of overhead proposals could have

reduced engineering services by as much as $517,000, or about 8.3%.

Contract Documents

Contract documents were properly prepared and executed in a timely manner. All necessary authorizations and approvals were obtained and were fully documented as required. Contract terms conformed to the sealed bid submitted by vendors. Contracts contained adequate liquidated damage clauses and other clauses as necessary to protect the District's interest. Project managers though, allowed design work to commence for engineering contract amendments, prior to consummating the agreement and without issuing a Notice-to-Proceed. This practice was widespread and even resulted in additional work being completed before executing a formal amendment.

Contract Amendments

To the District's credit, additional work ordered through contract amendments was distinctly different than work already in the original contract scope of work. Modifications appeared necessary and did not appear to entail items that should have been included in the original scope of work. All contract time extensions reviewed appeared to be necessary, reasonable, and sufficiently documented in contract files. Contract amendments for value engineering added $572,038 in additional design costs to the ECP project, but we substantiated staff estimates that these additional efforts will result in an estimated construction cost savings of $3.3 million, a savings of almost $6 for every additional design dollar spent.

Based upon our findings, we made twelve recommendations that were accepted in their entirety by management. Details of our findings and recommendations follow.

ECP DESIGN COSTS APPEAR REASONABLE; CONSTRUCTION MANAGEMENT COSTS SHOULD BE CAREFULLY MONITORED

Engineering design costs for the Everglades Construction Project appear to be reasonable based on an analysis we performed that compared aggregate design costs to-date to various benchmarks. However, planned spending for construction management costs should be closely monitored. For the five ECP projects reviewed, we compared actual contracted engineering amounts and the in-house costs of internal design and construction management efforts, to estimated and actual construction contract amounts using various relevant benchmarks.[1] Several benchmarks were used to evaluate the reasonableness of engineering services including:

- *Everglades Protection Project Conceptual Design*, Prepared by Burns and McDonnell, 1994
- *Design Services Fee Survey*, 12th Edition, PSMJ Resources
- *Federal Acquisition Regulations*, Section 15.903(d)(1)

The results of our research and analysis follow:

Benchmark # 1 - Everglades Protection Project Conceptual Design Document

The conceptual design document for the project was issued in February 1994 by Burns & McDonnell. This document is incorporated by reference into the Everglades Forever Act (EFA) and is thereby an integral part of the EFA. Relevant engineering costs for design and construction management services as a percentage of construction costs were estimated for the project by Burns & McDonnell as follows:

Description	Percent
Detail Engineering Design Service	7.00
Construction Contract Procurement and Management Services	6.50
Total	**13.50**

[1] All data for the construction and engineering contracts was obtained directly from data contained in the Procurement Division's contract files. All data for internal cost was obtained directly from the District's Local Government Financial System (LGFS). Construction costs were based on actual contract amounts plus a change order contingency of 10%.

Design Services

The following table displays a comparison of both the estimated construction costs at the time the design contracts were negotiated and actual contracted costs incurred for detail design services to the budgeted amounts per the Conceptual Design Document:

Detail Design Phase[2]	Estimated	Actual
Estimated/Actual Cost	6.4 %	8.2%
Cost (%) Per Conceptual Design Document	7.0 %	7.0%
Difference – Over (Under)	(0.6)%	1.2%

For the five projects in our analysis, actual construction costs[3] total $69.3 million. The actual cost for the engineering design services totals $5.7 million, more than $830,000 above the 7% budget benchmark. It should be noted however, that construction contract bids came in significantly below District estimates, as well as below the original conceptual design document budget for these projects. This resulted in a smaller than expected divisor. Estimated construction costs at the time the design contracts were negotiated was $87.8 million. Using this amount as the divisor results in a percentage of 6.5%, which is below the benchmark amount.

Construction Management Services

The following table displays a comparison of estimated construction management services costs planned to be incurred to the budgeted amounts per the Conceptual Design Document:

	Estimated	Actual
Estimated Cost Planned To Be Incurred	6.5%	8.8%
Cost % Per Conceptual Design Document	6.5%	6.5%
Difference	0.0%	2.3%

[2] It should be noted in viewing the table that the 8.20% for detail design includes the cost of drawings, specifications, surveying, and office engineering during the construction phase. The cost of gathering geotechnical data is excluded.

[3] Construction costs represents the dollar amount of the actual original contract award plus a 10% contingency.

The following table includes the detailed dollar amounts for the five contracts in our analysis and reflects the estimated cost for construction management services, by project, compared to what it would be based on the Conceptual Design Document's 6.5% budget amount.

Comparison Of Current Planned Spending For Construction Management To Conceptual Design Allowance by Project				
Project	**Construction Cost**	**Current Budgeted Estimate[4]**	**Per Conceptual Design (6.5%)**	**Difference Over (Under)**
STA 1W Works	$ 20,403,000	$ 2,109,000	$ 1,326,000	$ 783,000
STA 2W Works	27,435,000	2,178,000	1,783,000	395,000
STA-6 Sec 1. Works	2,099,000	158,000	136,000	22,000
STA 5 Works	12,243,000	564,000	796,000	(232,000)
STA1W&1E Inflow & Distribution	7,157,000	1,068,000	465,000	603,000
Total	**$ 69,337,000**	**$ 6,077,000**	**$ 4,506,000**	**$ 1,571,000**
Percentage		**8.8%**	**6.5%**	**2.3%**

As shown in the above table, the projected cost of construction management is about $1.6 million higher than what should be spent based on the projected 6.5% of construction costs used in the Conceptual Design Document's budget. The District's total budget for these projects just prior to bid opening was more than $92 million. Applying the Conceptual Design Document budget of 6.5% to this amount results in estimated construction management costs of $6,024,000, which is in line with projections. This would explain why these amounts were found acceptable by the ECP team at the time they were awarded.

Based on our discussions with ECP Project Managers, current utilization of external engineering firm resources may result in $1 million less in actual expenditures. In addition, our estimate of internal (in-house) costs included in construction management is $460,000 or 17% less than the amount estimated by ERD's Project Control Division in their estimate dated December 1997. We found that their estimates need to be updated to reflect actual staffing patterns and labor rates. This could reduce the cost of construction management services to about 7% of construction cost.

[4] The current budget estimate includes internal (in-house) cost for construction management of $2,610,000

Benchmark # 2 - Design Services Fee Survey, 12th Edition, Published By PSMJ Resources, Inc. (The "Fee Survey")

The Fee Survey is a summarization of surveys received from 261 engineering firms and is used by the construction and engineering community. It was performed by PSMJ Resources, Inc. an international provider of strategic planning, management, marketing information, and services for the design and construction industries. The Fee Survey contains project type fee data (i.e. % of construction costs) for 44 different types of projects. While the construction of the Stormwater Treatment Areas are unique as projects go, the primary components are not (i.e. land clearing, levees, pump stations, bridges, etc.) The Fee Survey contains data for wastewater treatment plants and road construction. These are considered the most comparable because they entail water structures such as pump stations, and roadwork entails a lot of earth moving. Therefore, we found that the study contained useful benchmarking data.

Design Services

The Fee Survey shows that design costs usually range from 6% to 9% of construction costs with a mean of 8%. Since a portion of the ECP also entails construction of water control structures, the Fee Survey results for Wastewater Treatment Plant projects were also considered. It reflects civil/site engineering design costs ranging from 7% to 10% with a mean of 8%. The range is slightly higher than road construction, but the mean is the same. Thus, 8% appears to be a reasonable overall benchmark based on the Fee Survey.

To adjust the District's cost to be comparable to the Fee Survey benchmark, amounts for value engineering,[5] program engineering,[6] and geotechnical services were deducted from the total design amount. Also, costs for "office engineering" during the construction phase were added to this amount. Net of these adjustments, the District's design cost is 8.2% of construction cost which is about $138,000 more than the amount that it would have been based on the 8% benchmark. This indicates that the aggregate amount spent on engineering design costs appear to be reasonable.

---

[5] Value engineering is the concept of reviewing original project design work to identify alternatives that may reduce construction costs without sacrificing quality and functionality. See page 24 for further details.

[6] Program Engineering are those services that relate to the entire Everglades Restoration Project rather than to a specific STA.

Construction Management Services

The results of our analysis for this benchmark are consistent with our analysis using the Conceptual Design document. The Fee Survey provided benchmarks for construction management services ranging from 3% to 5% with a mean of 3%. The benchmark for Wastewater Treatment Plants ranges from 3% to 6% with a mean of 4%. Thus, 4% appears to be a reasonable benchmark. Combined internal and external construction management services for the five projects within the audit scope are 8.8% of construction costs.

Benchmark # 3 - Federal Acquisition Regulations (FAR)[7]

This section of the FAR sets statutory limitations over costs for certain negotiated type contracts for Federal government agencies. It states that: "[f]or architect-engineering services for public works or utilities, the contract price or the estimated cost and fee for production and delivery of designs, plans, drawings, and specifications shall not exceed 6 percent of the estimated cost of construction of the public work or utility, excluding fees." This benchmark is only applicable in assessing the design portion of the project. The 6% limitation only applies to plans and specifications. The FAR does not contain any limitation factor relating to the cost of construction management services. We performed a detailed analysis of ECP design costs to calculate what the equivalent results would be if we were to apply the federal standard to the District.

Relevant costs for plans and specifications totaled $2.9 million for the actual ECP contracts reviewed representing 4.2% of construction costs. This compares favorably to the FAR's cost limitation of 6%.

Based on our analysis, design costs for the ECP appear reasonable. Although our analysis indicates that design costs fall within a reasonable range, in our opinion, there were certain aspects of the negotiation process and related strategies that could have been employed to further improve the results. Details will be presented in subsequent sections of this report.

[7] Federal Acquisition Regulations § 15.903(d)(1). We were provided with technical support as to the application of this regulation from the Jacksonville District of the U. S. Army Corps of Engineers.

Combined internal and external construction management services are 8.8% of construction costs--considerably higher than both the 6.5% Conceptual Design benchmark and the even lower PSMJ Fee Survey benchmark rate. However, construction management services are being performed by a combination of engineering firm personnel and District staff. The services provided by the engineering firms are being performed under unit price contracts with "not-to-exceed" maximums. Therefore, these costs will be more controllable than the design costs that were contracted for on a fixed price basis.

Recommendation

1. **The Director of ECP should closely monitor the planned level of expenditures for construction management services and ensure that his project management team continues to identify strategies for cost reductions and savings.**

   Management Response: Management concurs. The Director of the project continues to fine tune strategies to manage staff and consultants in construction management roles as a cost saving measure. The Project Oversight Team, which was instrumental in making design recommendations to bring the project in line with the budget, continues to review and make recommendations to ECP management and the District's Governing Board, about the project design, construction costs and expenditures. This role will continue throughout the construction phase of the project. The Project Oversight team is made up of engineer professionals from the Army Corps of Engineers, Florida Department of Transportation, Florida Department of Environmental Protection, Burns & McDonnell, (the consulting firm who developed the Conceptual Design and original estimate for the Everglades Construction Project), PMA (an engineering firm specializing in cost estimating), and the management of the Everglades Construction Project.

   Responsible Division: Everglades Construction Project

   Estimated Completion Date: Initiated/Ongoing

APPROPRIATE PROCEDURES FOLLOWED FOR CONTRACT PREPARATION AND SOLICITATION

Our evaluation and testing of bid preparation and solicitation procedures indicated that contracts were properly planned and that the most appropriate solicitation method was selected for individual procurement actions (i.e., Request for Bid, Request for Proposal, etc.). We also noted that the most appropriate payment method was selected for the type of work to be performed (i.e. lump sum, unit price, cost plus, etc.). Bid solicitation documents contained complete statements of work, drawings, specifications, schedules, adequate terms and conditions, and an explanation of how proposals/bids would be evaluated. Brand names were used whenever possible and, when used, at least more than one brand was used or the solicitation specified "or equal." Contracts were properly solicited and public notice/outreach was sufficient enough to stimulate sufficient interest resulting in a fair level of competition. The time allowed for contractors to prepare bids also appeared reasonably sufficient.

Sealed Bid Opening Process

For the bids in our sample, we observed that written minutes were the only documentation maintained for District bid opening sessions. While the current practice is acceptable, an alternative commonly employed by government organizations is to record (either audio or video) the opening of competitive sealed bids.[8] Such recordings have been found to be invaluable in the event of bid protests. We were informed that the Procurement Division has instituted recording bid openings.

Recommendation

2. **The Procurement Division should consider adopting the procedure of recording sealed bid openings sessions as a standard practice.**

   Management Response: Management concurs. This recommendation has already been implemented.

   Responsible Division: Procurement
   Estimated Completion Date: Completed

[8] National Association of State Purchasing Officials

GOOD VENDOR SELECTION PROCEDURES WERE FOLLOWED

The selection practices for engineering services appeared to be performed objectively. Our observations of sealed bid openings indicated that the integrity of the process was maintained. Subsequent to bid opening, lowest bidders were screened to determine whether they were responsive and responsible.

For construction contracts, bids were lower, overall, than the independent estimates prepared prior to the receipt of the bids. The low bids appeared reasonable when compared to next lowest bids received.

Insurance and bonding requirements were met by the contractors and were verified by District staff. Similarly, the requirements of the District's Minority/Woman Business Enterprise Program were complied with.

PRICE NEGOTIATION PRACTICES AND PROCEDURES NEED IMPROVEMENT

Contract Administrators from the District's Procurement Division work with Project Managers in the Everglades Construction Project Division to negotiate prices for contracts solicited through Request for Proposal methodology, and in negotiating price adjustments to existing contracts.

Engineering services are procured through the process established by the Consultant's Competitive Negotiation Act[9] (CNNA). The process entails soliciting proposals from prospective firms, evaluating the proposals, and numerically ranking them. The next step is to commence fee negotiations with the top ranked technically qualified firm. For the Everglades Construction Project, the design work was divided among the top five ranked firms from a single Request for Proposal.

Detailed fee estimates were solicited from the five top ranked firms. The fee estimates received generally consist of an itemization of the number of hours estimated for each task by staff category. These quantities are multiplied by base salary rates. Direct labor costs are multiplied by a "multiplier" factor to

[9] According to District Policy 07.100 Procurement and Contracting, Part 07.10020 Standards for Competitive Procurement Subsection 5. Professional Services subject to CCNA procurement for design services related to construction are subject to Section 287.055 F.S. known as the Consultants' Competitive Negotiation Act (CCNA).

cover overhead and profit. Subconsultant and out-of-pocket expenses are then added to arrive at the total cost. The District's negotiating team evaluates the initial fee estimate and reviews the following cost components:

- Number of hours for each task,
- Assignment of task to the appropriate staff level,
- Base salary rates,
- Multiplier factor, and
- Estimated out-of-pocket expenses.

After the District's initial review, a negotiation session is held between the District's negotiating team and the individual firms. Additional negotiation sessions were held as necessary until an agreement is reached.

For many of the ECP design contracts, the final negotiated price was considerably less than the initial fee proposal submitted by the engineering firm. The following table illustrates the negotiating results for the contracts within our audit scope.

Comparison of Original Consultant Proposal to Final Negotiated Amounts by Contract

Contract Number	Project	Original Proposed Amount	Final Negotiated Amount[10]	Difference	Percent Difference
C-E101	STA 1W Works	$ 2,413,089	$1,101,709	$(1,311,380)	-54%
C-E201	STA 2W Works	2,679,300	1,890,325	(788,975)	-29%
C-E500	STA 6 Sec.1 Works	203,605	158,071	(45,534)	-22%
C-E500	STA 5 Works	951,902	883,474	(68,428)	-7%
C-E104	STA 1W & E1 Inflow & Distribution	748,647	622,394	(126,253)	-17%
Total		**$ 6,996,543**	**$4,655,973**	**$(2,340,570)**	**-34%**

The prices negotiated for design services appear to be within an acceptable range when compared to various benchmarks. However, our analysis of design service costs indicated that there is opportunity for further improvement in the District's negotiating strategies that may produce lower costs.

We found that contract files were missing certain critical supporting pricing documentation. In addition, the District did not perform independent detailed

[10] Does not include amendments.

cost estimates for negotiated engineering service contracts prior to receipt of cost estimates from engineering firms. Moreover, there were no written guidelines for conducting negotiations. We found significant variances in hourly rates and overhead/multipliers between the design contracts. There was no official record of negotiations documented in the RFP contract files that would explain the negotiating strategy followed by the teams. These matters will be discussed in further detail in the following subsections.

Incomplete Contract Files

For design contracts, District's procurement staff established direct labor costs by using the actual base labor rates of the firm's staff members. Verification of base labor rates is essential to this process. Accordingly, some procurement staff members indicated that they had verified the design firms' labor rates by obtaining payroll records and confirming that proposed rates were adequately supported. However, the procurement staff could not locate the files containing the payroll records. They explained that the engineering firm's payroll records were considered to represent proprietary financial information and are, therefore, exempt from public release or dissemination pursuant to the Public Records Law (119.07 F.S.). The Procurement Division maintains that the payroll records were segregated from the contract files. However, there were indications that verification of base pay rates was not a routine practice, and the District may have accepted memos from the design firms detailing salary rates in lieu of verification.

In summary, the procurement staff was unable to substantiate the rates paid to design firms, and we were unable to verify that the rates were adequately confirmed at the time of negotiation.

Recommendation

3. Verification of base labor rates should be a standard procedure.

Management Response: Management concurs. Base labor rates were confirmed during negotiations, but the documentation reflecting such could not be located in archived files. The Procurement Division will develop a formal procedure for verifying and documenting base labor rates.

Responsible Division: Procurement
Estimated Completion Date: October 1998

Recommendation

4. All records relating to a specific procurement should be maintained in the same procurement file.

Management Response: Management concurs. The Procurement Division has developed a standard operating procedure for maintaining all documents relating to a contract in a single contract file. This will include clearly segregating vendor financial information in order that it can be removed when the file is requested for review under Chapter 119, Florida Statutes (Florida's Public Record Law), since certain vendor financial records are exempt. This should eliminate the difficulty in retrieving financial records after contract files are archived.

Responsible Division: Procurement
Estimated Completion Date: Completed

Engineering Contracts Negotiated Without Independent Detailed Cost Estimates

The ECP Division did not prepare an independent detailed cost estimate for engineering projects, an essential ingredient to formulating a negotiating position. According to the CCNA, the District is required to "adopt administrative procedures for the evaluation of professional services." Florida Statute 287.055 (5) Competitive Negotiation (a) states:

> The agency shall negotiate a contract with the most qualified firm for professional services at compensation, which the agency determines fair, competitive, and reasonable. In making such determination, the agency shall conduct a detailed analysis of the cost of the professional services required in addition to considering their scope and complexity.

While District contracts are not subject to Federal rules and regulations, we noted, as a best practice that the Federal Government requires that a Government estimate for the cost of Architect-Engineer services be furnished

to contracting officers prior to entering into negotiation for all contracts and contract modifications that exceed $100,000. [11]

The District's negotiating teams relied solely on non detailed estimates for design services that were based on a percentage of the estimated construction cost of the individual project. An independent detailed cost estimate for engineering projects, prior to receiving the initial fee estimates from the engineering firms, was never prepared. This would have demonstrated that a good negotiating strategy was used for ECP design contracts with specific goals that upon conclusion of negotiations would show the reasonableness of the final agreed upon fees. The two subsections following our recommendation corroborate our concern.

Recommendation

5. **A detailed cost estimate for engineering projects for each proposed contract or contract modification should be prepared by user Departments and furnished to the Procurement Division's Contract Administrator prior to commencing negotiations.**

   Management Response: Management concurs that a Pre-Negotiation Memorandum, which provides a detailed analysis of the cost of the professional services required, should be prepared and submitted to the Contract Administrator. As per the requirement in Section 287.055(5) Florida Statutes, analysis should also consider the scope and complexity of the work. This can be accomplished without going into the same level of detail that would be required of a professional services firm to be able to create a proposal. Our greatest strength in negotiating a contract for professional services lies in our ability to negotiate the number of hours necessary for completing the tasks required, coupled with our ability to zero in on the correct level of professional staff necessary to complete the task. The rest of the unknowns (including indirect costs, overhead, equipment, multipliers and profit) will either be negotiated or reviewed for audit compliance and reasonableness. Those items vary considerably from firm to firm. It is essential that none of the documentation prepared to assist in negotiations include a level of detail or explicit negotiating strategies that would give an unfair

[11] Federal Acquisition Regulations Section 36.605 Government cost estimate for architect-engineer work.

advantage to a vendor, since it will be available to vendors under Florida's Public Record Law.

Responsible Division: Procurement
Estimated Completion Date: October 1998

Variances Between Hourly Rates Among Engineering Contracts

The District did not negotiate labor rates with any of the firms or make a determination as to the reasonableness of the rates contracted. The District accepted actual labor rates paid by the firm to selected individuals without regard to the average salary rates paid by the firms for individuals in the same job classification. This likely resulted in higher costs because the individuals selected were generally highly paid.

Fully loaded labor rates are established by taking the actual hourly salary rates of the employees included in the firms proposal, times a multiplier factor to cover overhead and profit. We performed an analysis of the hourly rates negotiated for engineering consulting contracts. This analysis focused on comparing the hourly rates negotiated between four different engineering firms to assess the degree of consistency that results from the District's methodology. The following five staff categories were established for the purpose of this analysis.

- Partner/Principal
- Senior/Specialist Engineer
- Staff Engineer
- Design/Drafter/CADD
- Administrative/Clerical

The following table reflects the range of rates for the five staff categories and also shows the standard deviation and percentage the standard deviation is from the mean.

Staff Category	Lowest	Highest	Standard Deviation	% Deviation from Mean
Partner/Principal	$ 95.13	$ 153.58	$ 28.69	22.9%
Senior/Specialist Engineer	69.80	112.80	15.38	18.1%
Staff Engineer	56.94	66.63	3.52	5.6%
Design/Drafter/CADD	40.58	59.24	6.41	13.1%
Administrative/Clerical	25.04	46.23	9.06	24.6%

The average hourly rates varied considerable between firms. The most significant deviations occurred at the highest level (partner/principal) and at the lowest level (administrative/clerical support). Hourly rates were fairly close together in the middle three categories that constitute, on average, 80% of the total hours.

The following table shows the total direct labor cost, total hours, and average hourly rate.

Contract Number	Project	Total Direct Labor Cost	Total Hours	Average Hourly Rate
E101	STA1 Interior Works	$ 2,086,848	28,453	$ 73.34
E201	STA2 Interior Works	2,315,361	33,532	$ 69.05
E500	STA 5&6 Interior Works	759,621	11,690	$ 64.98
E104	STA 1 Inflow & Distribution	888,920	14,806	$ 60.04
	Total	**$ 6,050,750**	**88,481**	**$ 68.38**
	Standard Deviation			**$ 5.68**
	Percentage Deviation from Average			**8.31%**

Average hourly rates ranged from $60.04 to $73.34, for a difference of 18.1% between the lowest to the highest. Also, the standard deviation was calculated at $5.68 per hour, which is an 8.31% deviation from the mean of $68.38 per hour. All four engineering firms were fairly large and of comparable size.

Hourly Rate Benchmarks

Our analysis also entailed identifying benchmarks to use for hourly rate comparisons. We again found that the best source for benchmarking was the *Design Services Fee Survey,* published by PSMJ Resources, Inc. (the "Fee Survey"). It contained comparative average billing rates by various staff categories ranging from principal to clerical. It also presented average hourly

billing rates based on other characteristics such as firm size, region, industry, business sector, etc. Our analysis involved comparing the hourly rates by staff category for the four selected contracts to those in the Fee Survey based on the following categories:

- Regional - South
- Sector – Government
- Industry – Transportation[12]
- Firm Size

The following tables reflect the results of our analysis. Actual dollar amounts negotiated by the District were compared to what they may have been if rates comparable to those in the Fee Survey had been achieved.

Category	Actual Dollar Amount	$ Amount Based on Survey Avg.	Difference (Over) Under	Percent Difference
South	$ 6,050,750	$ 4,824,508	$(1,226,242)	-20.3%
Government	$ 6,050,750	4,940,853	(1,109,897)	-18.3%
Transportation	$ 6,050,750	4,840,085	(1,210,665)	-20.0%
Firm Size	$ 6,050,750	$5,964,305	(86,445)	-1.4%

The District's engineering hourly rates appear to be higher than average. The only reason we could find for the higher rates was the size of the firms the District contracted with. Using figures published by PSMJ Resources for "firm size" did not result in such marked differences. Although firm size may explain why hourly rates are higher than average, it does not explain or justify the significant hourly rate variations between comparable size firms.

The firm for STA 1 Interior Works was consistently the highest, and STA 1 Inflow & Distribution Works was consistently the lowest, in all four categories. This tends to indicate that District negotiators may not be placing enough emphasis on cost, and may not be willing to terminate negotiations with a top ranked firm whose fees may be higher than other firms.

Although the hourly rates varied significantly between firms, they were essentially all performing similar type work of comparable complexity. Thus, a significant variation in pricing between firms does not appear to be justified. The firms that charged the highest rates were also the firms chosen for the

[12] Transportation was considered to be the most similar industry to compare the STAs since both predominately entail earthwork.

largest projects. This effectively served to increase design costs overall because those higher hourly rates were paid to the two firms with 71% of the total level of effort.

There was no evidence that comparisons in proposed pay rates were made between the various consultants the District negotiated with or historical rates paid by the District. The District negotiators purportedly relied solely on the actual paid rates as justification for the rates contracted for. In our opinion, this does not provide adequate justification to conclude that the rates were reasonable. The presumption of reasonableness cannot be based solely on the proof provided by a prospective contractor of the incurrence of actual costs. Among the other factors that might have been considered was compensation paid to other firms in the same industry, compensation practices of other firms in the same geographic area, and compensation practices of firms engaged predominantly in governmental work.

Recommendation

6. **Proposed rates should be subjected to comparative analysis and negotiation. The District should document that the final agreed upon rates are reasonable.**

   Management Response: Management concurs that a comparative analysis of proposed hourly rates should be conducted to ascertain their reasonableness, recognizing that the range of rates for the same titled position may vary from firm to firm depending upon experience, longevity and job expectations. (Using the District as an example, a senior supervising engineer has a base rate that ranges over 60% from minimum to maximum. Experience, job performance, and longevity influence the actual paid rate. Similar occurrences exist within the professional services community. A preaward audit program (Recommendation No. 9) could facilitate contract negotiations. Company payroll records would be verified and District negotiators could concentrate on such items as the consulting firm's proposed hours of work, proposed position level of involvement, and proposed multiplier (profit, overhead and fringe benefits).

   Responsible Division: Procurement
   Estimated Completion Date: October 1998

7. **Written guidelines should be established for conducting negotiations including the preparation of a record of negotiation memorandum.**

   Management Response: Management concurs with establishing written guidelines for conducting negotiations. Management also concurs with documenting individual negotiations so long as the District's specific negotiating strategies and tolerances are not subject to disclosure under Chapter 119, Florida Statutes (Florida's Public Record Law).

   Responsible Division: Procurement
   Estimated Completion Date: October 1998

Variances in Contracted Overhead Rates

The major component of the aggregate hourly rate paid to design consultants is not contained in the rate of pay of the individual employee, but rather the overhead rate. We found that the District ECP Design contracts contain higher average overhead rates than the average government contract.

An overhead factor is applied to the direct labor cost to cover fringe benefits, general and administrative costs. The effective overhead rate for the four engineering contracts within the audit scope are reflected in the following table:

Contract Number	Project	Overhead Factor*
C - E101	STA 1 Interior Works	1.65
C - E201	STA 2 Interior Works	1.65
C - E500	STA 5 & 6 Interior Works	1.82
C - E104	STA 1 Inflow & Distribution Works	1.62
Overall	**Weighted Average**	**1.66**

* Excludes profit

Overhead and profit benchmarks were also identified in the *Design Services Fee Survey,* 12th Edition, published by PSMJ Resources, Inc. The Fee Survey provided information regarding overhead limitations that were established by 101 government agencies at state, local, and federal levels. The number of overhead factors for each government category was

averaged. The overall average, weighted average, and average by government category are shown in the following table:

Government	No. of Agencies	Overhead Factor**
State DOTs	39	1.35
Other State and Local	40	1.41
Federal Agencies	22	1.30
Weighted Average	**101**	**1.36**

* DOT = Department of Transportation
** Excludes profit

As can be derived from the above table, the averages cluster around a close range, thus, a factor of 1.36 was determined to be a reasonable benchmark. Adding a 10% profit factor to the base labor and overhead results in a gross multiplier factor of 2.60. If the multiplier on these four contracts had been capped at 2.60, it would have resulted in saving approximately $517,000, or about 8.3% of the total costs. The major difficulty in using a firm's historical overhead rate is that it tends to result in providing higher compensation to those firms with less efficient overhead cost structures.

Recommendation

8. The Procurement Division should consider establishing a cap on multipliers.

Management Response: Management concurs. Prior to the work for the ECP, the District did not have enough volume of work for consultants to leverage a multiplier cap, so the multiplier was negotiated with each individual firm. With the current and anticipated volume of engineering services the District will be procuring, the Procurement Division has begun researching methodologies available for establishing a limitation on overhead factors. Management does not believe historical levels of engineering services procured prior to embarking on the Everglades Construction Project design would have supported a limitation on overhead factors without having a negative impact on the number of firms competing for projects.

Responsible Division: Procurement
Estimated Completion Date: October 1998

Field Pricing Support

For negotiated contracts and modifications to contracts, the District does not include in its negotiating strategy field pricing support. This can be obtained by implementing a preaward audit process. The auditor's key role in preaward audit activities includes verifying that proposed costs are based on current, complete, and accurate information that has been substantiated through a review of the prospective contractor's financial records.

Preaward audits could expose hidden fees and duplicate, unallocable, unallowable or overstated costs that otherwise could not be uncovered during negotiations. The procurement decision is clearer when both sides have the same information and are negotiating on a "level playing field" regarding the definition of costs and fees.

Recommendation

9. **The Procurement Division in consultation with the Office of Inspector General should develop criteria for implementing a preaward audit program.**

Management Response: Management concurs.

Responsible Division: Procurement
Estimated Completion Date: October 1998

CONTRACT EXECUTION

Contract documents were properly prepared and executed in a timely manner. All signatory authorizations were adhered to on all forms and documents requiring approvals. Contract terms were in accordance with the sealed bid submitted by vendors. Contracts contained adequate liquidated damage clauses and other clauses, as deemed necessary, to protect the District's interest as ultimate owner. However, we found that contract amendments for numerous design contracts were not executed timely.

Work Performed Prior to Contract Execution

There were numerous instances where project managers allowed design work to commence for engineering contract amendments prior to consummating the agreement and without issuing a Notice-to-Proceed.

Work on a considerable number of amendments was actually completed prior to executing the amendment. All work should be formally approved in writing before work commences. The following table summarizes our findings:

Contract Number	Number of Amendments	Instances Where Work was Actually Completed Prior to Contract Execution	Instances Where Work Started Prior to Contract Execution	Total
C-E101	7	2	3	5
C-E104	3	2	1	3
C-E201	8	5	3	8
C-E500	6	0	1	1
Total	**24**	**9**	**8**	**17**

Work was commenced on 17 out of 24 amendments prior to execution of the amendments. Furthermore, the work was completed for 9 of these amendments prior to contract execution. A *Notice-to-Proceed* was not issued upon authorization to commence work. One amendment (in addition to those in the above table) indicated that the performance period commenced on the date of the *Notice-to-Proceed.* However, no such *Notice-to-Proceed* was ever issued.

The District has also received deliverables prior to executing a formal contract for such work. Examples of work performed without formal authorization include:

- Additional topographic field survey
- Additional modeling and hydraulic analysis
- Redesign of certain water structures
- Construction contract procurement services
- Engineering construction support services
- Alternative levee designs
- Value engineering design changes

The practice of executing contract amendments, subsequent to commencement or completion of work, circumvents controls established to ensure that work is fully authorized and approved. It also impairs the District's ability to negotiate the best price for the project(s). This is particularly the case in those situations where fees are negotiated after work is entirely completed. The District's procurement policy No. 07.10010, item 6, states:

> District employees shall refrain from making oral representations or entering into any oral agreements unless they have delegated procurement authority, as defined in Section 07.10015 and in Delegation of Authority No. 07.101 - Delegation of Executive Director Procurement, Revenue and Zero Dollar Transaction, Execution and Other Authority. All oral agreements by employees with delegated authority shall subsequently be memorialized in writing.

There is no documentation that authority to enter into oral agreements was delegated by the Executive Director.

Recommendation

10. **Project Managers should be advised not to allow contractors to commence work on a project before an agreement is executed. In situations where time is of the essence, procedures should be established where, at a minimum, a formal *Notice-to Proceed* could be issued setting forth the scope of work and a price not to exceed limit.**

    Management Response: Management concurs. The Procurement Division in conjunction with Office of Counsel will formalize procedures to be used where time is of the essence that will result in a formal Notice-to Proceed setting forth a limited scope of work and a price not to exceed amount. Project Managers will be advised on a recurring basis not to allow contractors to commence work on a project before an agreement is executed.

    Responsible Division: Procurement/ Office of Counsel
    Estimated Completion Date: July 1998

No Dates on Contract Signature Page

The signature page on District contracts does not include the date that individuals signed the document. The only date on most contracts is on a blank line on the first page that is filled in by hand when signed by the District's representative.

Contracts are sent out to the contractor for signature, who signs it without putting any date on it, and returns it to the District. When the contract is

signed by the District, the date is filled in on the front page of the contract. This date is considered the contract execution date.

Requiring dates along with the signature would provide better sequential documentation of the process and could be beneficial in establishing the facts in cases where additional costs are claimed due to delay.

Recommendation

11. District contracts should include dates on the contract signature page.

Management Response: Management concurs

Responsible Division: Procurement/Office of Counsel
Estimated Completion Date: Completed

AMENDMENTS AND CHANGE ORDERS

We found that change order work was distinctly different than work already in the original contract scope of work. Accordingly, modifications appeared necessary and did not appear to entail items that clearly should have been anticipated and included in the original scope of the contract. Contract time extensions were necessary, reasonable, and sufficiently documented in contract files.

Some engineering contract amendments were for value engineering efforts that resulted in construction cost savings.

Value Engineering Results in Construction Cost Savings

The ECP Division awarded a total of $572,038 in additional design costs for value engineering efforts. These efforts resulted in estimated construction cost savings of $3,333,248. This equates to saving $5.83 in construction costs for each dollar spent on value engineering.

Value engineering is the concept of reviewing original project design work to identify alternatives that will reduce construction cost without sacrificing quality and functionality. Following are examples of some of the value engineering projects performed:

- Alternative levee designs
- Downsizing pump stations
- Standardizing equipment specifications

We found the District's pursuit of value engineering opportunities to be a highly effective technique for reducing project costs.

Change Order Overhead and Profit Allowance for Sub-Subcontractors

The contract General Conditions, Section 15, which addresses change orders, states the following:

> For all change order work done by the Subcontractor, the respective Subcontractor may add an amount not to exceed fifteen percent (15%) of the actual costs for combined overhead and profit, and the Contractor may add an amount not to exceed seven and one-half percent (7½%) of the above Subcontractor's cost for his overhead and profit.

In some cases there may be more than one tier of subcontractors. The contract General Conditions do not specify a different overhead and profit allowance in the event of second and third tier subcontractors. The current language could be interpreted to allow each tier of subcontractor to add 15% overhead and profit. This can result in a significant amount of overhead and profit being added to direct cost.

Recommendation

12. The Procurement Division should modify construction contract language for change orders to limit markup for contractors and subcontractors who do not perform the work directly to 7½%.

Management Response: Management concurs.

Responsible Division: Procurement
Estimated Completion Date: July 1998